# BTEC Assignment Brief

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| **Qualification** | Pearson BTEC International Level 3 Subsidiary Diploma in Applied Science<br>Pearson BTEC International Level 3 Foundation Diploma in Applied Science<br>Pearson BTEC International Level 3 Diploma in Biomedical Science<br>Pearson BTEC International Level 3 Extended Diploma in Biomedical Science |
| **Unit number and title** | **Unit 9: Biomedical Science** |
| **Learning aim** | **C:** Examine the use of urinalysis as an analytical and diagnostic tool |
| **Assignment title** | **Urinalysis** |
| **Assessor** | |
| **Issue date** | |
| **Hand in deadline** | |

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| **Vocational Scenario or Context** | You are a laboratory technician in a pathology laboratory in a local hospital. As a biomedical science technician working in the medical sector, you need to have appropriate practical analytical skills in testing urine samples to enable you to diagnose a range of health disorders and infections.<br>Urine tests are commonly used to investigate changes in a patient's health status because variation in the chemical composition of urine can indicate normal/abnormal biological functioning. Detection of these biochemical changes allow many diseases to be detected in the early stages. Your supervisor has set up some Continuing Professional Development (CPD) for you to ensure that your knowledge and skills remain up to date. |

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| **Task 1** | As part of your annual CPD in your role of laboratory technician in a pathology laboratory you are required to carry out diagnostic testing of urine. Your supervisor has also asked you to prepare a report that explains the composition and production of urine in humans. Your work will focus on three case studies and be in three sections:<br><br>**Section 1**<br><br>● **Explain** what changes to normal urine composition reference range values might indicate in terms of the normal functioning of the body systems and the patient's health, and<br>● **Explain** how urine production helps to maintain normal biochemical values in the human body (e.g. by the conservation or excretion of water and inorganic ions and the reabsorption or excretion of organic solutes)**.** Link your findings to **explain** why urinalysis is often the first test used in diagnosing and treating medical conditions. |

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| | **Section 2**<br><br>• You will be provided with samples of urine from at least THREE patients. **Carry out** simple urinalysis tests correctly on each of three samples. You should **carry out** a visual test (colour and clarity) a number of chemical tests using test strips (choose a selection from: specific gravity for determining concentration, pH, blood, protein, glucose, bilirubin, urobilirubin, ketones, nitrite, human chorionic gonadotropin (HCG)) and look under the microscope (for a selection from: crystalline structures, trichomonads, blood cells, microorganisms, epithelial cells, casts). Your samples will dictate what you find. Specify how the samples were taken and preserved in order to prevent misleading results<br><br>• Identify the changes in the composition of the sample urine from normal values. **Explain** and **analyse** the results of each of the three patient's urinalysis and make a comparison against normal values in order to reach a diagnosis of health status change. Your case studies must **explain** the issues related to the risk of contamination when collecting urine samples and the importance of correctly preserving the samples prior to testing (i.e.why cleanliness of genitalia and sterility of collection vessels before sample collection is important, the purpose of mid-stream sample collection, why specific times of day for sample collection are sometimes recommended, length of time between sample collection and testing and preservation methods of samples that will not be tested immediately). Consider that samples may be collected in a Hospital, Doctor's surgery or by the patient at home.<br><br>**Section 3** - Can you trust your results?<br><br>• **Evaluate** the use of urinalysis and the biomedical scientist's role in investigating, monitoring and reporting the results to other healthcare professionals from samples provided by at least **three** different patients, to include both clinical (e.g. hospital) and domestic settings (e.g. home testing kits). You will need to access and quote data identifying normal ranges of values for the substances present in urine samples you tested. Suggest what you think the disease of each patient may be and justify this with the data you have collected. Consider the implications of inaccurate interpretation of results and how errors can be reduced in relation to sample collection, preservation and analysis in both domestic and clinical settings. |
| **Checklist of evidence required** | **Three** patient case studies that include:<br>● an evaluation of the clinical and domestic use of diagnostic testing of urine in relation to the detection of diseases<br>● an analysis of how the results of urinalysis is used to detect changes in health status. |

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| | ● an explanation of the variations in the main components of urine in health and disease.<br>● evidence that you correctly carried out the urinalysis investigations – results, evidence in your lab book validated by your Assessor and/or an observation record sheet. |
| **Criteria covered by this task:** | |
| Unit/Criteria reference | To achieve the criteria, you must show that you are able to: |
| **C. D3** | Evaluate the use of urinalysis in domestic and clinical settings. |
| **C. M3** | Analyse how the results of urinalysis are used in diagnoses of health status changes. |
| **C. P7** | Explain how urine composition may vary in relation to health. |
| **C. P8** | Correctly carry out simple urinalysis. |
| **Sources of information to support you with this Assignment** | http://labtestsonline.org.uk/<br><br>http://www.webmd.com/a-to-z-guides/urine-test?page=3<br><br>http://chemistry.about.com/od/biochemistry/f/What-Is-The-Chemical-Composition-Of-Urine.htm<br><br>http://www.medicinenet.com/urinalysis/page4.htm<br><br>Ideas for practical investigations can be found via:<br>● https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/34325-RSC%20Problem%2010%20Patient%20prognosis%20intro.pdf |
| **Notes to Assessor and technician** | It is important to provide three varied samples to allow the students to cover a substantive amount of the unit content and meet the assessment guidance found in the 'Essential information for assessment decisions' section of the unit specification. The samples must be accompanied with basic data about the referral, such as where the sample was taken and by whom and what tests have been requested by the healthcare professional. At least one sample should be taken in a domestic setting and one in clinical setting. From this the learner should be able to deduce the possible diseases the tests are indicative of.<br><br>The practical activities suggested for this assignment are required to be safety checked by the Centre before use. Pearson Education can take no responsibility for the safety of any practical activities.<br><br>Before doing any practical activity, you should always carry out your own risk assessment and refer to the necessary regulations. In particular, any local rules issued by your employer must be obeyed, regardless of what is suggested here.<br><br>Centre should use Health and Safety information provided by a reputable source. In the UK such an example organization is CLEAPSS |

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| | http://science.cleapss.org.uk/Resource/SSS003-Human-body-fluids-and-tissues.pdf |